



Defense Energy Support Center

**Product
Technology
&
Standardization**

Defense Energy Support Center Division

Alternative Fuels Information Station

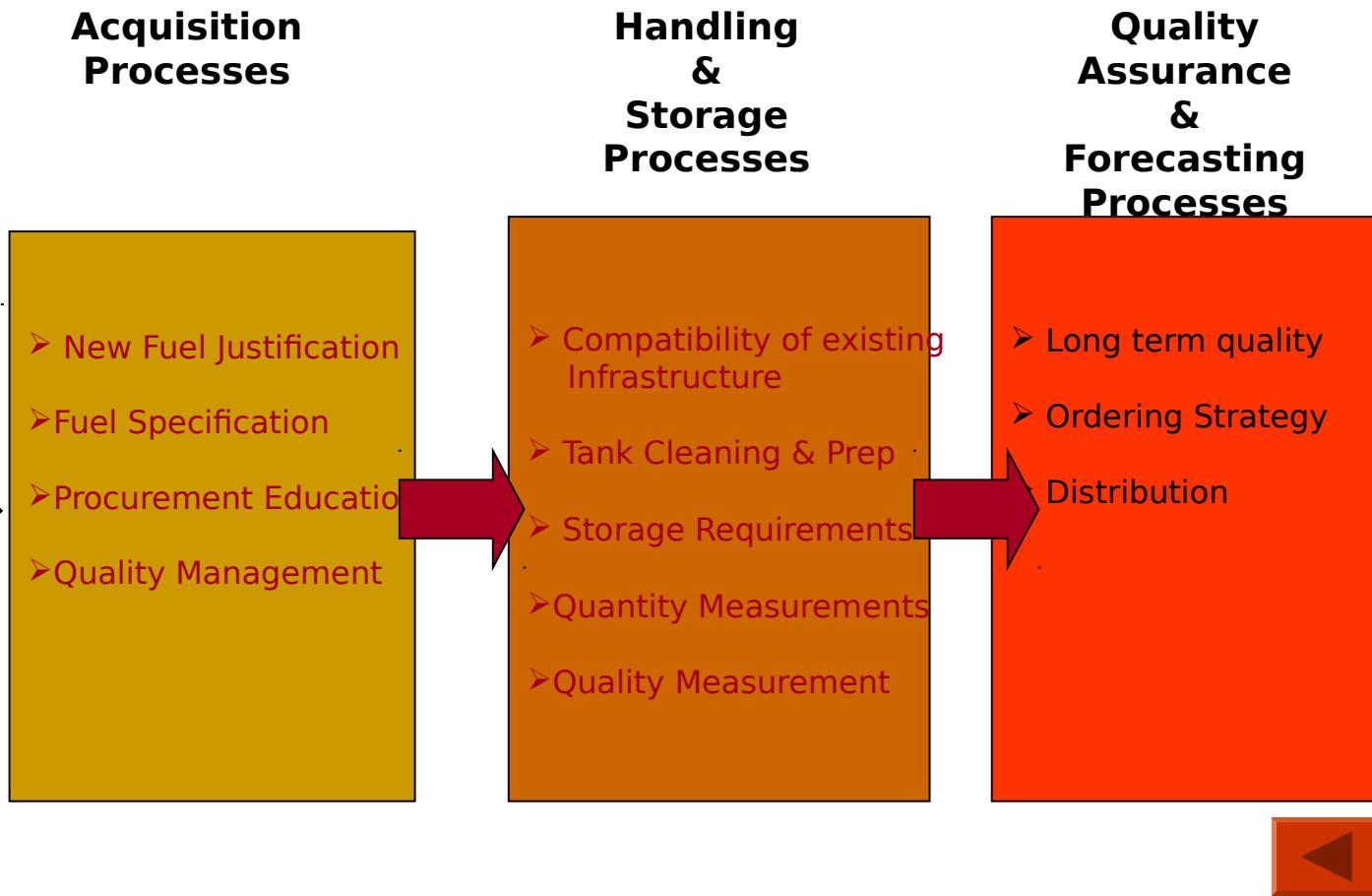
**Alternative Fuel Logistics
Tutorial**



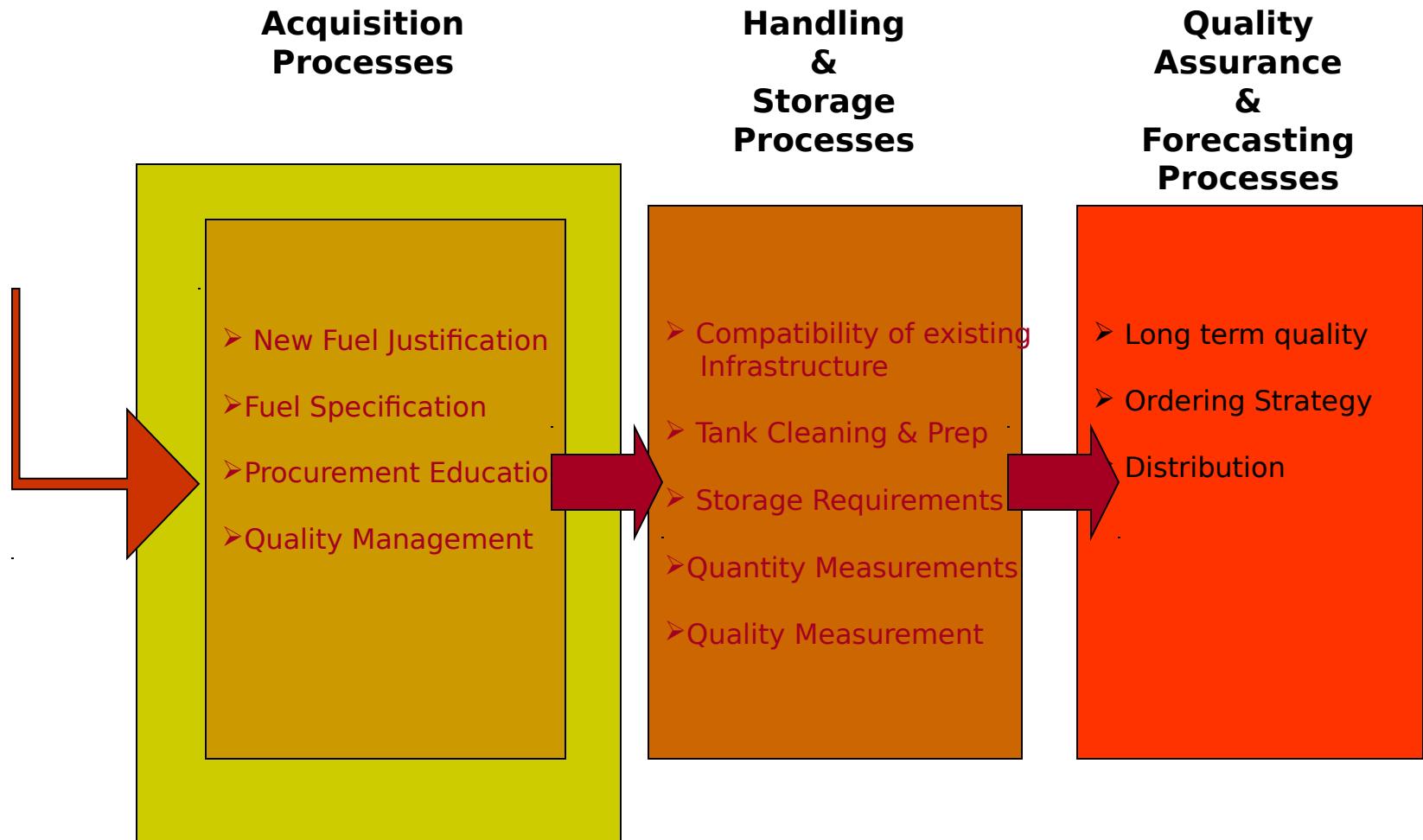
Learning Objectives

You should learn....

DESC Fuel Introduction Process (Fuel Logistics)



DESC Fuel Introduction Process (Fuel Logistics)



Justification of New Fuels

Energy Policy Act (EPAct) 1992

EO 13149

DoD Strategy

Established National Energy Policy Goals Towards Energy Security with provisions on Energy Conservation, Environmental Preservation, Petroleum Fuel Consumption and Alternative Fuel Usage

Established DoD policy for procuring Alternative Fuel Vehicles and Alternative Fuels

Established the Fleet Management Program which put stipulations on gasoline fuel consumption and introduction of alternative fuel vehicles

What are the new fuels?

Biodiesel Fuel (B100)

 Mono alkyl esters of long chain fatty acids made from vegetable oils and animal fats

 B20- 80% Diesel Fuel + 20% Biodiesel

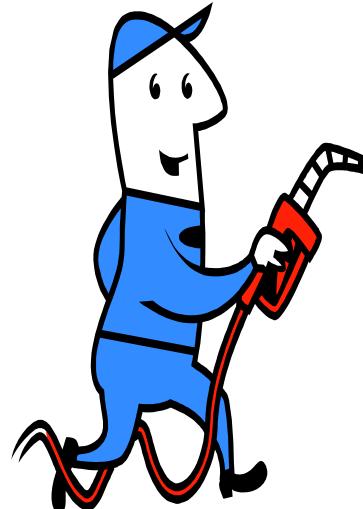
 Commerical Item Description A-A-59693 A

Fuel Ethanol

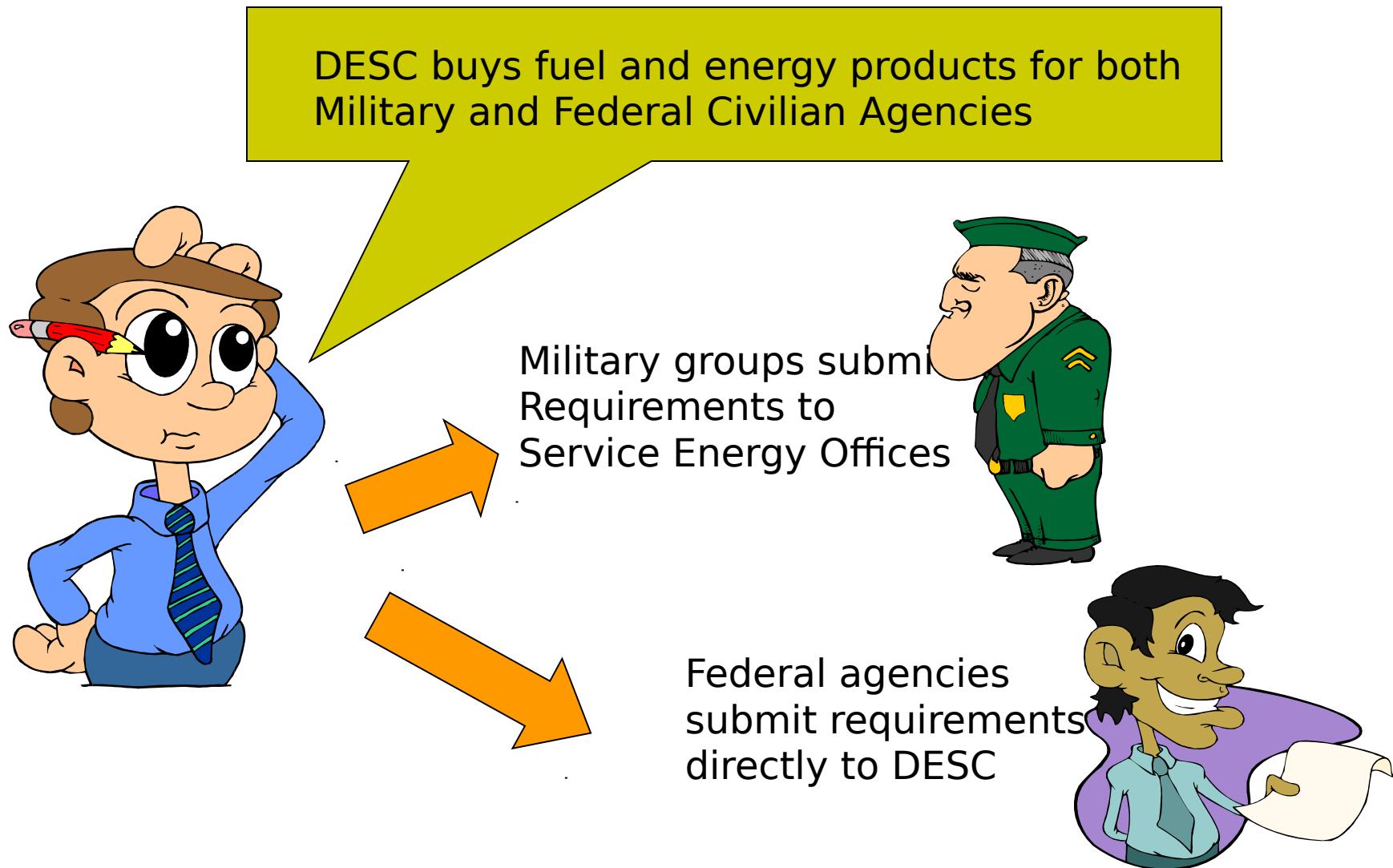
 Made from grain/feedstock products

 E85- 85% Fuel Ethanol + 15% Gasoline

 Fuel Ethanol (Ed75-Ed85) ASTM-5798



How Do I Acquire Alternative Fuels from DESC?



What Should The Requirements Document Include

At A
Minimum:



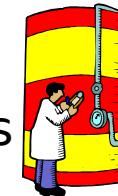
Location



Current Point of Contact



Projected Annual Usage (Gallons)



Number & size of Tanks



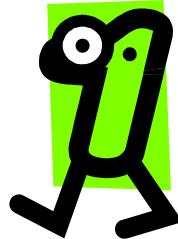
Preferred Method of Delivery



Frequency of Deliveries



How Does DESC Purchase Alternative Fuels? (e.g. B20, E85)



DESC consolidates requirements by Geographic regions designated as Customer Organized Groups (COG)



Prepares solicitation packages and Advertises to potential suppliers



Suppliers bid on the entire region or specific line items



Ground Fuels Division (DESC-PE/PL)

Commerical Phon
(703) 767-XXXX

DSN
427-XXXX

Kathryn
Riso
x9511

Kathryn
Riso
x9511

Kathryn
Riso
x9511

Kathryn Riso
x9511

Kathryn Riso,
x9511

Tyler Parker,
x9536

Vacant,
x8461

Dave Peterson,
x9510

Mark Jones,
x9520



Solicitation Package Contents

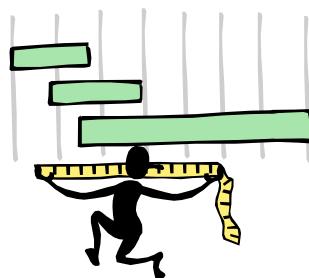
Informs potential suppliers of the terms and conditions for bidding including.....



Fuel Specifications



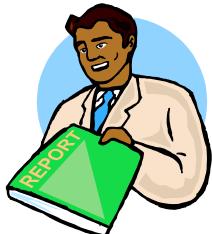
Quality Assurance Provisions



Quantity Measurements

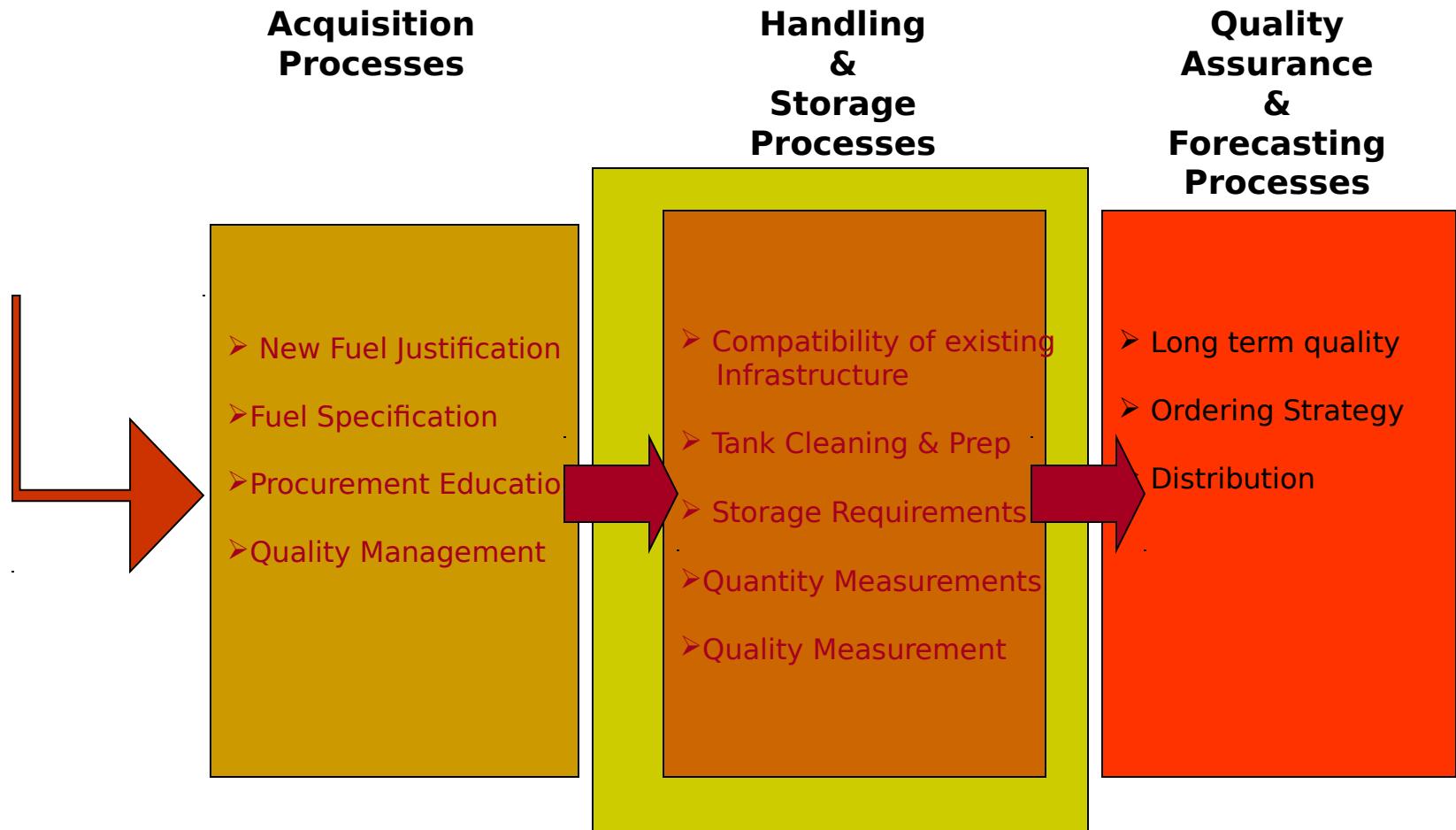


Delivery Requirements



Points of Contact

DESC Fuel Introduction Process (Fuel Logistics)



Biodiesel Properties

Per Specification Clause C16.27 B20 Biodiesel (DESC Oct 2003)

PRODUCT COMPOSITIONAL REQUIREMENTS

1. 20% +/- 1% mono-alkyl esters of long chain fatty acids derived from virgin vegetable oil blend stock and/or yellow grease blend stock per ASTM D 6751.
2. 80% minimum low sulfur diesel fuel oil conforming to ASTM D 975, grade low sulfur number 1-D or grade low sulfur number 2-D.

SIGNIFICANT PRODUCT PERFORMANCE REQUIREMENTS

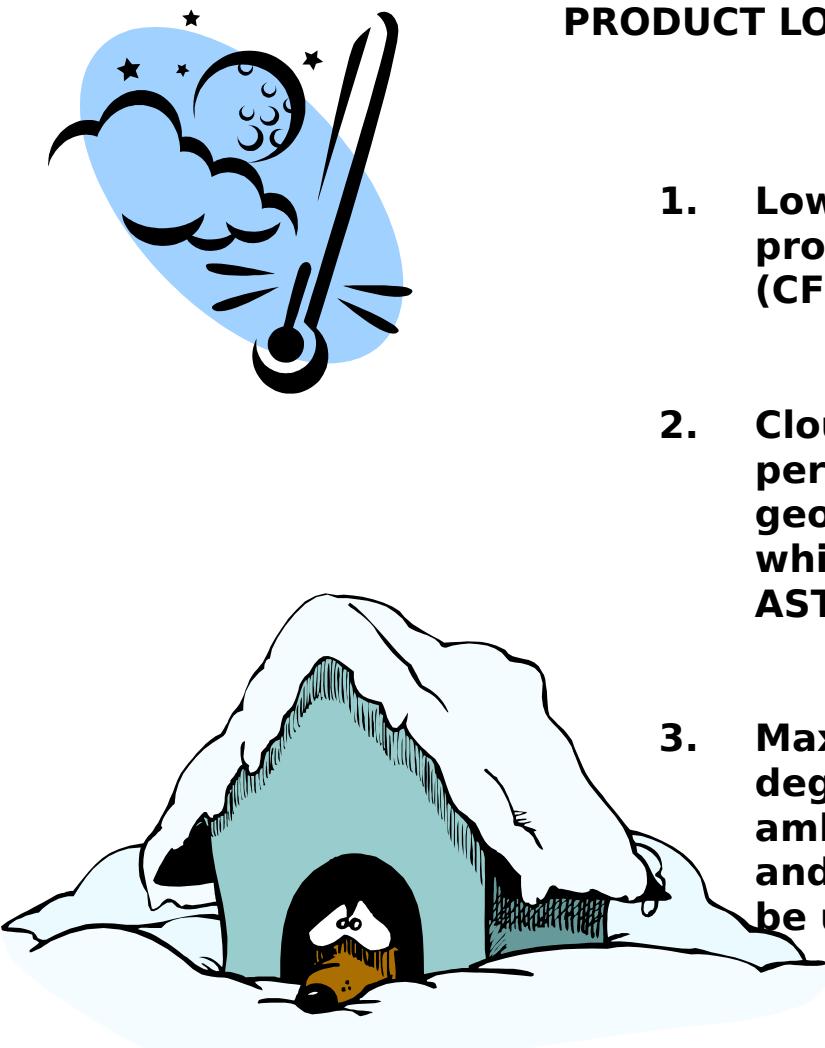
1. Appearance per ASTM D 4176 - Clear & Bright
2. Cloud Point Per ASTM D 2500(test) and ASTM D 975 (characteristics)



Biodiesel Properties

Per Specification Clause C16.27 B20 Biodiesel (DESC Oct 2003)

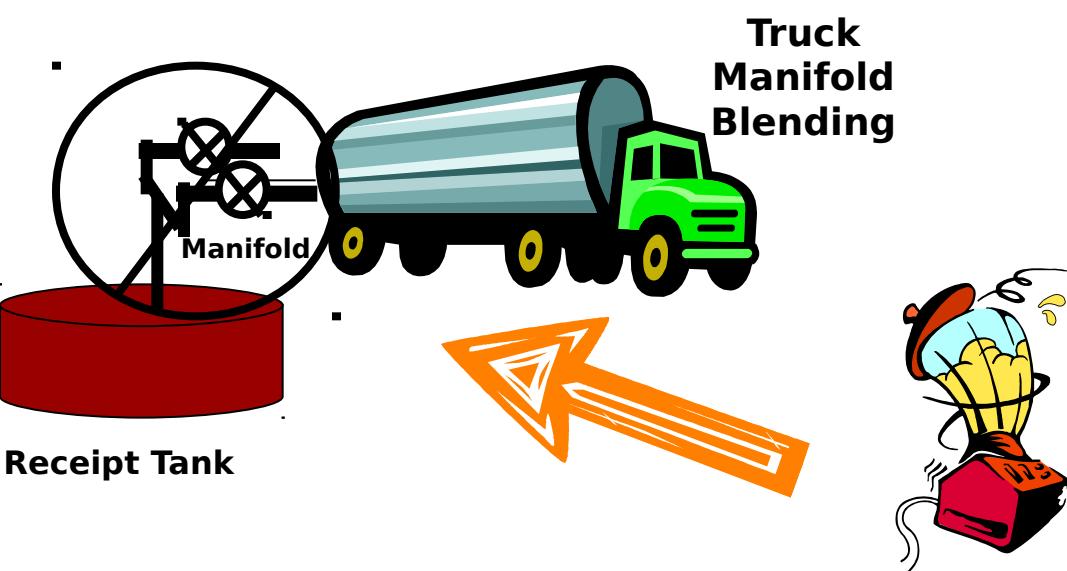
PRODUCT LOW TEMPERATURE PERFORMANCE



1. Lower temperature defined by 1 of the 2 properties: Cloud Pt, Cold Filter Plugging Point (CFPP)
2. Cloud Point tested per ASTM D 2500 $< \text{or } =$ 10th percentile minimum ambient temperature in the geographical area and seasonal timeframe in which the B20 is to be used, when tested per ASTM D 975
3. Max CFPP of the B20 shall be a minimum of 10 degrees Celsius below 10th percentile minimum ambient temperature in the geographical area and seasonal timeframe in which the B20 is to be used, when tested per ASTM D 6371

Biodiesel Quality Assurance

Techniques NOT permitted by DoD Specification



**Splash Tank
Blending
In
Receipt
Tanks**

Receipt Tank

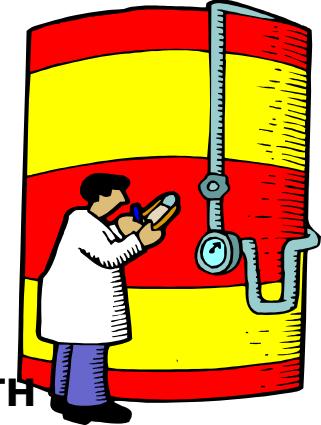
**NOTE: AFTER FIRST SHIPMENT OF BIODIESEL, FILTERS
SHOULD
BE CHECKED AND MAY NEED TO BE CHANGED DUE TO THE
CLEANING CAPABILITIES OF THE BIODIESEL PRODUCT.**



Biobiesel Fuel Management

Fuel Tank Cleaning Requirements

USE EXISTING DIESEL TANKS



- (1) DETERMINE AMOUNT OF WATER IN THE TANK WITH WATER FINDING PASTE.
- (2) LOOK AT WATER FINDING PASTE FOR ANY CLUMPS OF SLUDGE OR SEDIMENT AND FROM THIS, ESTIMATE LEVEL OF SLUDGE OR SEDIMENT IN THE BOTTOM OF THE TANK.
- (3) IF TANK DOES NOT CONTAIN MORE THAN 1/4 INCH OF WATER AND LESS THAN 1/2 INCH OF TOTAL WATER, SLUDGE AND SEDIMENT, THEN DRAW THE TANK DOWN AS LOW AS POSSIBLE AND REFILL WITH BIODIESEL.
- (4) IF WATER/SLUDGE/SEDIMENT LAYER IS GREATER THAN 1/2 INCH, ATTEMPT TO DRAIN AS MUCH AS POSSIBLE. IF IT CAN BE DRAINED TO THE REQUIREMENTS IN 3 ABOVE, THEN AS DO SO. THEN DRAW THE TANK DOWN AS LOW AS POSSIBLE AND REFILL WITH BIODIESEL.
- (5) IF DRAINING CANNOT BE ACCOMPLISHED, THEN THE TANK SHOULD BE CLEANED BEFORE PUTTING BIODIESEL IN THE TANK.

E85 Specifications

ASTM D5798-99 Standard Specification for Fuel Ethanol (Ed75Ed85) For Automotive Spark-Ignition Engines

Property	Value for Class			Test Method
ASTM volatility class	1	2	3	N/A
Ethanol, plus higher alcohols (minimum volume %)	79	74	70	ASTM D5501
Hydrocarbons (including denaturant) (volume %)	17-21	17-26	17-30	ASTM D4815
Vapor pressure at 37.8°C				
kPa	38-59	48-65	66-83	ASTM D4953, D5190, D5191
psi	5.5-8.5	7.0-9.5	9.5-12.0	
Lead (maximum, mg/L)	2.6	2.6	3.9	ASTM D5059
Phosphorus (maximum, mg/L)	0.3	0.3	0.4	ASTM D3231
Sulfur (maximum, mg/kg)	210	260	300	ASTM D3120, D1266, D2622
Methanol (maximum, volume %)		0.5	N/A	
Higher aliphatic alcohols, C3-C8 (maximum volume %)		2	N/A	
Water (maximum, mass %)		1.0		ASTM E203
Acidity as acetic acid (maximum, mg/kg)		50		ASTM D1613
Inorganic chloride (maximum, mg/kg)		1		ASTM D512, D7988
Total chlorine as chlorides (maximum, mg/kg)		2		ASTM D4929
Gum, unwashed (Maximum, mg/100 mL)		20		ASTM D381
Gum, solvent-washed (maximum, mg/100 mL)		5.0		ASTM D381
Copper (maximum, mg/100 mL)		0.07		ASTM D1688
Appearance	Product shall be visibly free of suspended or precipitated contaminants (shall be clear and bright).		Appearance determined at ambient temperature or 21°C (70°F), whichever is higher.	

N/A = Not applicable

Source: DOE: Handbook for Handling, Storing, and Dispensing E85

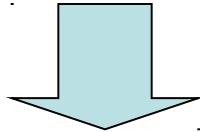


E85 Fuel Management

In many cases, existing, gasoline, diesel, or other hydrocarbon fueling systems are suitable to store and dispense E85

Use of Existing Fueling Systems

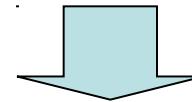
Many metal and fiberglass tanks which meet EPA codes, Dec. 98 are compatible with E85



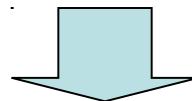
**Fiberglass tanks manufactured before 1992
MAY NOT able to store E85**

Preparing Existing Fueling Systems

DO NOT use plated steel tanks!!!



Tank cleaning is required to remove gasoline particulates.



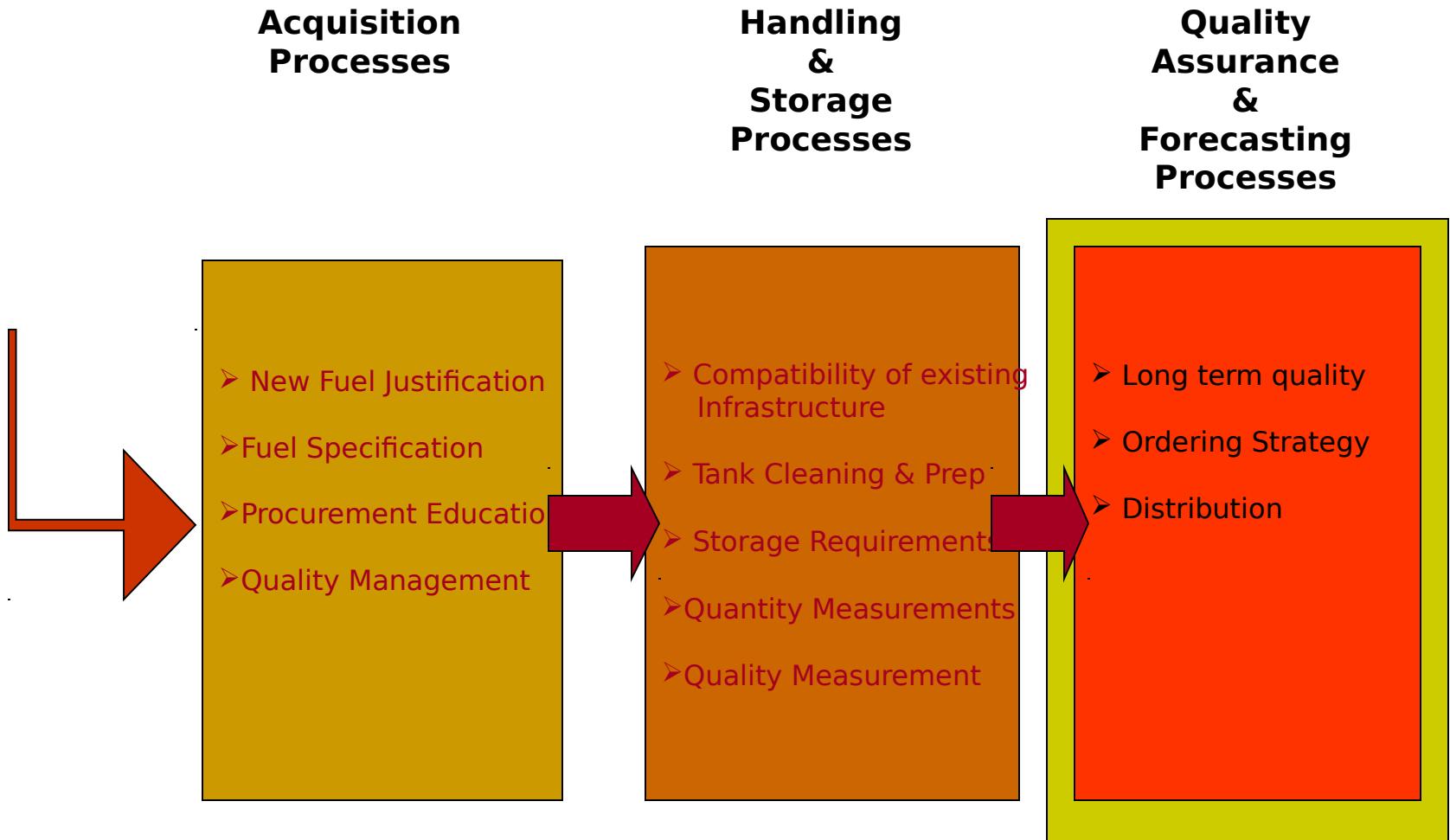
The cleaning technique chosen will depend on the previous fuel stored and the condition of the tank.

Contaminated fuel is the most common source of operational problems with E85!!!

Source: Handbook for Handling, Storing, and Dispensing E85



DESC Fuel Introduction Process (Fuel Logistics)



How does the government determine the quantity of a fuel delivery?

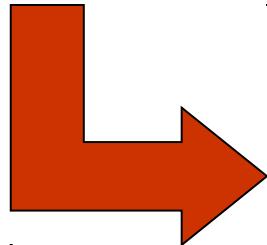
Government Determination

DESC ground fuel customers receive fuels by 3 transportation modes:

Transport Truck with meter

Truck & Trailer with meter

Tank Wagon (equipped with meter by default)



Receiving government entity determines fuel quantity

1. Meter measurement
- OR
2. Weight (using calibrated scales)
- OR
3. Calibrated meter on receiving tank system

Note: Quantity measurement and delivery conditions are defined in F1.01-1 ***“Delivery Conditions for Transport Trucks and Trailers, and Tank Wagons”*** in DESC Ground Fuel Contracts.

How does the government determine the quantity of a fuel delivery?

Contractor Determination

Contractor may determine fuel quantity by:

1. Calibrated meter on the delivery conveyance
OR
2. Gauging the delivery conveyance
OR
3. Certified receiving tank markers
OR
4. Load rack meter or calibrated scales

Note: Quantity measurement and delivery conditions are defined in F1.01-1 ***“Delivery Conditions for Transport Trucks and Trailers, and Tank Wagons”*** in DESC Ground Fuel Contracts.

Quality Assurance Requirements

Contractor Quality Activities



Alternative Fuels are supplied under Posts, Camps and Stations (PC&S) FOB Destination Contracts



Quality Assurance criteria and responsibilities are defined in E Clauses of the contract



Contractors are responsible for having a Quality System and product Quality assurance including maintaining records, sampling and testing of product



Quality Assurance Requirements

Government Quality Activities



Government Inspection and Acceptance are usually by receiving activities at destination



Receiving locations should report delivery and quality problems to contracting officer and quality problems to DESC-BQ



Contractor may be required to submit samples to government laboratory



Government reserves right to perform quality inspections at all times



Alternative fuels are commercial products and there is no government inspection at the vendor facilities



Handling & Storage Strategy

Gasoline/ Ethanol Fuel (E85)

Standard gasoline is refined or blended to be consumed with minimum storage time.

Gasoline intended for extended storage requires additives which improve storage quality



E85 is handled and stored in a manner consistent with Gasoline; however, Fuel operating equipment and materials should be evaluated for compatibility.

Diesel/ Biodiesel (B20)

Standard diesel fuel is also refined to be consumed with minimum storage time.

Standard diesel fuel is blended with additives to improve cold temperature storage.



Biodiesel fuel storage requirements are similar to those of standard diesel.

Additives are available which can assist with storage and cold temperature handling



Summary

You should now know and understand...



DESC Fuel Introduction Process (Fuel Logistics)

Acquisition Processes

- New Fuel Justification
- Fuel Specification
- Procurement Education
- Quality Management

Handling & Storage Processes

- Compatibility of existing Infrastructure
- Tank Cleaning & Prep
- Storage Requirements
- Quantity Measurements
- Quality Measurement

Quality Assurance e & Forecasting Processes

- Long term quality
- Ordering Strategy
- Distribution

